

To: The University of Oslo, Faculty of Mathematics and Natural Sciences,
Department of Biosciences & the Board of CEES

Report of the Scientific Advisory Board of CEES

September 2016

The Scientific Advisory Board (SAB) of the Centre for Ecological and Evolutionary Synthesis (CEES), a national Centre of Excellence (CoE), met on September 5–6, 2016, at the University of Oslo. The SAB is, as ever, very grateful to Nils Chr. Stenseth and his administrative team for organizing a highly productive and informative meeting. A full schedule of talks arranged for the SAB included a summary of key CEES findings from the previous twelve months, details of grants for research and networks awarded and pending, and a broad range of research summaries. It is clear from this meeting, as well as those of previous years, that exciting research is being done at CEES, and that the Centre has been an outstanding success in all key metrics. It was particularly impressive to see a marked increase in the number of publications in the very best journals (*Nature*, *PNAS*, *Science*), as well as continued success in securing significant external funding.

The development of a cohesive, supportive and well-resourced research environment has clearly attracted a wealth of talent and led to a melting-pot of imaginative ideas and research questions. Given that there remains only one year left of the core CoE-funding, the CEES is now faced with two major challenges. The first of these is essentially logistical and relates to the administrative structure of the CEES and its relationship with the rest of the Department (and Faculty) going forward once the core CoE-funding ends.

It is the view of the SAB that one of the reasons for the success of the CEES is that it has had a dedicated administrative team providing not only the type of standard support that, it can be argued, could be provided by a centralized facility (e.g. finance, human resources) but also direct and specialized support of grant

writing and submission, post-grant administration, and maintenance of a cohesive community of researchers (including a large number of short and long term visitors) at all levels through social activities and workshops.

The spirit of collaboration and the interdisciplinary nature of research at the CEES drive the unique and vibrant discovery environment that has been so productively nurtured over the last few years. The SAB believes it important to protect the infrastructure (the excellent administrative team, the sequencing facilities, and the DNA laboratory) that facilitated this environment. The SAB had useful discussions with the Dean of the Faculty of Mathematics and Natural Sciences and the Head of the Department of Biosciences on the full cognizant of the inevitable conflict in priorities that arise in such circumstances. Nevertheless, it is quite clear to the SAB that the success of the CEES has been wholly reliant on a robust and efficient administrative structure and that, ultimately, continued success of the CEES has important beneficial consequences for the Department, the Faculty, the University of Oslo, and even for Norwegian science generally. The CEES “brand” can be exploited to continue to attract research funding and the best international talent but only if there is sufficient support to continue the administrative work done by a dedicated team of support staff continuing as an integral part of CEES, rather than those tasks falling on the academics. It is the experience of the SAB internationally that when administration is centralized, the heavier burden falls on the academics, reducing time and energy for research, with an inevitable fall in productivity overall.

The second challenge is more conceptual, and almost certainly even more difficult. This relates to how the CEES builds on its brand to trail-blaze a new synthesis so that the essence of the CEES will continue, not just as a great place to do science, but as an outstanding way to do science.

The excellent review of ongoing activities in a series of “speed talks” provided by staff scientists on their scientific research gave a broad picture of the research underway. The SAB was particularly impressed with the quality of the work on

ancient DNA recovery and analysis, notably the findings from analysis of ancient fish bones, as one example, that provides insight into the Viking age origin of the Norwegian cod fishery. They have made an important contribution in linking the use of genomic technologies to applied questions related to ecology and evolution, as well as extraordinarily important contributions to the application of genomic technologies to questions related to ecology and evolution. The capacity in genomics and the tools of this new and burgeoning field that has been built by the CEES must continue. It is now a very rich resource for the University of Oslo and should not be lost. For example, the paleogenomics of domestic animals and relationship of climate change (environmental changes) and harvested ecosystems being explored by CEES scientists offer a view to providing information useful for sustainable management in today's changing world.

The SAB is impressed with the large number of high quality, high impact manuscripts being published. Clearly there is strong initiative and drive to excellence manifested by the CEES team in their prolific publication. There is a risk, however, of too many directions of research being followed and a focus on the unique, scientific strengths of CEES is recommended. Nevertheless, it needs to be emphasized that the CEES scientists are asking the right questions and, indeed, the big questions and seeking answers to these questions with new, powerful analytic tools.

The challenge related to successful integration of ecology and evolution and in being able to demonstrate relationships that would not have been discovered by focusing on either ecology or evolution, whilst ignoring the other, is the core of CEES. The work on emerging diseases from the environment represents a good example of this synthesis, but for other areas (sparrows, cod, ancient DNA), it is important to highlight how a focus on the intersection between ecology and evolution leads to new general principles. The SAB strongly believes that the CEES is uniquely placed to elucidate the many ways in which evolutionary change is rooted in evolutionary principles, and to influence many other fields of science, as a result.

The SAB addressed the need for an exit strategy beyond 2017. The CEES clearly has become international and visibly so as a scientific unit. Using genomics as a tool and working closely with classical biologists is a commendable and successful strategy. However, greater communication of the findings of CEES scientists is strongly recommended. The rest of the world should be informed of the findings of the CEES scientists beyond their scientific publications. The SAB recommends that the knowledge gained on diseases with an environmental origin and on the integration of ecology, evolution, and genomics should be highlighted in a major symposium held annually or biannually in Oslo. This would be a valuable contribution to global science and offers a mechanism for dissemination of the work of CEES. A suitable name for such a symposium could be “The Oslo Symposium on Ecology, Evolution, and Genomics.” This would become a lasting trademark for the University of Oslo.

In addition, a scientific equivalent of the Dahlem workshop could possibly be a way to achieve a global dialogue and produce useful documents that are focused on the synthesis of ecology and evolution. The title of such a workshop could be “The CEES Workshop on Integration of Ecology and Evolution.” A Dahlem-type of workshop was indeed recently organized by CEES and a publication from that endeavour is being prepared (tentative title: “Biotic drivers of macroevolution”). Perhaps infectious diseases would be a logical theme for the next workshop, tentatively held every third year.

The immediate task for the CEES is to work on outward facing and branding to protect and expand its success. The tools of today’s communication – an up to date blog, tweeting new papers as published, listing collaborators on its website etc. – are important to communicate the successes of CEES in today’s world.

Time should, during the closing year of CoE-core funding to CEES, be dedicated to defining how to continue this extraordinary enterprise. The challenge is to define a core set of characteristics that comprises the essence of CEES, and ensure that they continue. Much has been gained and much has been learned. It

takes a firebrand to start such an initiative, as Nils Chr. Stenseth has done, and now the University of Oslo can build on this initiative that has proven so successful – just as has been the intention with the CoE funding through the Research Council of Norway.

Clearly, we should take the lesson from Charles Darwin; he was as much about ecology as evolution. His writings provide an intellectual basis that argues for the continuation of CEES, to ensure its funding beyond the inaugural ten year time frame to provide impetus and a spirit of discovery.

In summary, the SAB strongly believes the University should embrace CEES as an outstanding success and seek further development of what has been achieved. The publication rate is high and increasingly the young staff scientists are publishing their results in top journals. An infrastructure has been created and it should not be lost. The University stands to gain immeasurably in retaining the success of the CEES in recruiting outstanding faculty, and has an opportunity to capitalize on the teaching and research, incorporating it into its life sciences initiative.

Rita Colwell, Tim Coulson, Edward Feil, Anne Magurran, Gordon Orians, and
Barbara Mable